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(71) Applicant *(for all designated States except US)*: MASKINFABRIKEN TAARUP A/S [DK/DK]; Taarup Strandvej, DK-5300 Kerteminde (DK).

(72) Inventor; and
(75) Inventor/Applicant *(for US only)* : LAURITZEN, Georg [DK/DK]; Heibergsvej 23, DK-5300 Kerteminde (DK).

(74) Agent: HOFMAN-BANG & BOUTARD A/S; Adelgade 15, DK-1304 Copenhagen K (DK).

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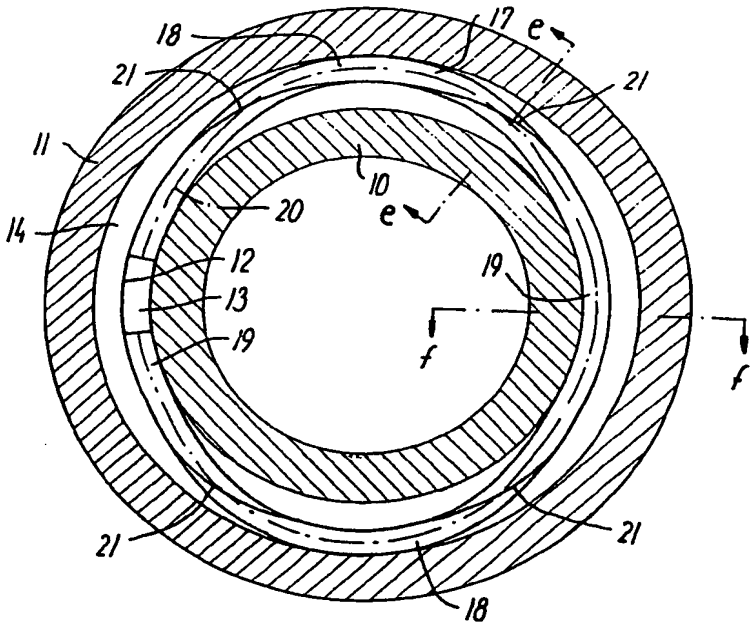
(54) Title: COUPLING MEANS



(57) Abstract

A substantially C-shaped resilient coupling means (17) for mounting in a ring-shaped space, which is formed by two oppositely positioned grooves (13 and 14) in mutually engaged cylindrical faces (12) on two coaxial parts (10 and 11), has a shape different from a circular arc shape so that some parts of the coupling means will be positioned entirely in the one groove and other parts in the other groove. The force necessary for cutting the coupling means when the two parts (10 and 11) are to be disassembled, is hereby reduced greatly because of the established reduction of the cutting zone (21).

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Coupling means

The invention concerns a substantially C-shaped, resilient coupling means of the type stated in the introductory portion of claim 1. The known coupling means of this type substantially have the shape of circular arcs and will frequently be so positioned in the space defined by the grooves that at any rate long extent thereof are present in the dividing face between the two parts. When these parts are to be disassembled, e.g. with a view to replacement of one part, which may e.g. be a ball bearing, the coupling means has to be cut through. This takes place by the scissors effect which is produced when the two parts are pressed away from each other. When the coupling means is positioned in the groove space as described above, cutting will take place substantially "longitudinally" or rather along the periphery and over long extent substantially along a diameter of the cross-section, i.e. it is a large amount of material which has to be cut through.

When, according to the invention, the coupling means is constructed as stated in the characterizing portion of claim 1, the cut amount of material is greatly reduced and cutting is correspondingly easier to perform.

When the coupling means has such as shape as is stated in claim 2, its central line intersects the dividing face between the two parts at four points, and cutting will then take place along relatively short faces positioned around these points.

The invention will be explained more fully below with reference to the drawing, in which

fig. 1 shows an axial section through two coupled cylindrical parts with ring-shaped grooves in which a substantially C-shaped coupling means of ordinary known type is positioned,

fig. 2 shows a section along the line a-a in fig. 1,

fig. 3 shows a section analogous to that of fig. 1, but with a coupling means of the invention positioned in the grooves,

fig. 4 shows a section along the line c-c in fig. 3, and

figs. 5 and 6 show sections along the lines e-e and f-f, respectively, in fig. 4.

In the drawing, 10 and 11 are two coaxial ring-shaped parts which are coupled together along coaxial, cylindrical faces 12. The inner part 10 may e.g. represent a ball bearing and the outer part 11 a means which is rotatably journaled by means of the ball bearing. In the cylindrical faces 12 engaging each other, the parts have oppositely positioned ring-shaped grooves 13 and 14, respectively, which mount a resilient, substantially C-shaped coupling means 15 which prevents relative axial movements of the two parts.

As shown in fig. 2, the known coupling means 15 is substantially circular when it is positioned in the ring-shaped space formed by the grooves 13 and 14, and engages the bottom of the outer groove 14 substantially along its entire periphery under the action of its own spring force.

When the two parts 10 and 11 are to be disassembled, e.g. with a view to replacement of a ball bearing, the coupling means 15 must necessarily be cut through, which takes

place by pressing the parts away from each other in the axial direction such that cutting takes place at the groove edges. The cutting zone is shown at a dotted line 16 in fig. 2, and it will be seen that this zone extends through the entire length of the coupling means and even extends along a diameter of the cross-section, so that it is a large amount of material which has to be cut through, which requires a correspondingly great force.

Figs. 3-6 show the same two parts 10 and 11 with ring grooves 13 and 14 and a cylindrical engagement face 15, like in figs. 1 and 2, but with a coupling means 17 according to the invention positioned in the grooves. This coupling means is substantially oval so that two diametrically oppositely positioned portions 18 of the means are present in the outer groove 14 alone, and two other diametrically oppositely positioned portions 19 separated about 90° from the first ones are present in the inner grooves 13 alone. The dividing line 20 of the coupling means which is shown in dotted form, thus intersects the engagement face 15 at four points and the cutting zone is reduced to and divided into four relatively short subzones 21 positioned around the four points of intersection. Each subzone passes obliquely through the coupling means and thus through the thickest portion thereof only at a single point.

It will be seen that the use of the coupling means 17 of the invention results in a great reduction of the amount of material which has to be cut through when the two parts 10 and 11 are to be disassembled, and thus a corresponding reduction in the force required for the cutting.

The invention is not restricted to the special embodiment shown and described above, since the coupling means does not have to be oval, but may e.g. be wave-shaped or

meander-shaped.

Patent Claims:

1. A substantially C-shaped resilient coupling means for locking two parts having mutually engaged, cylindrical, coaxial faces in an axial direction when mounted in a space defined by two oppositely positioned grooves in the two faces, characterized in that in relaxed state the coupling means has such a shape different from a circular arc shape that some parts of the coupling means, after mounting in said space, will be present in the one groove and other parts in the other groove.

2. A coupling means according to claim 1, characterized in that when relaxed it forms the greater part of an oval.

AMENDED CLAIMS

[received by the International Bureau on 27 March 1992 (27.03.92);
original claims 1 and 2 amended;
new claim 3 added; (1 page)]

1. A device for locking to parts having mutually engaged, cylindrical coaxial faces in an axial direction by means of a substantially C-shaped, resilient coupling means, which is mounted in a space defined by two oppositely positioned grooves in the two faces in a manner such that the two parts can be disassembled by cutting through the coupling means by relative axial movement of the two parts, c h a r a c t e r i z e d in that the coupling means has a shape different from a circular arc shape and the grooves have a depth with respect to the thickness of the coupling means in a radial direction such that some parts of the coupling means are present entirely in the one groove and other parts entirely in the other groove.

2. A device according to claim 1, c h a r a c t e r - i z e d in that when relaxed the coupling means forms the greater part of an oval.

3. A device according to claim 1, c h a r a c t e r - i z e d in that the coupling means is wave-shaped.

FIG.2

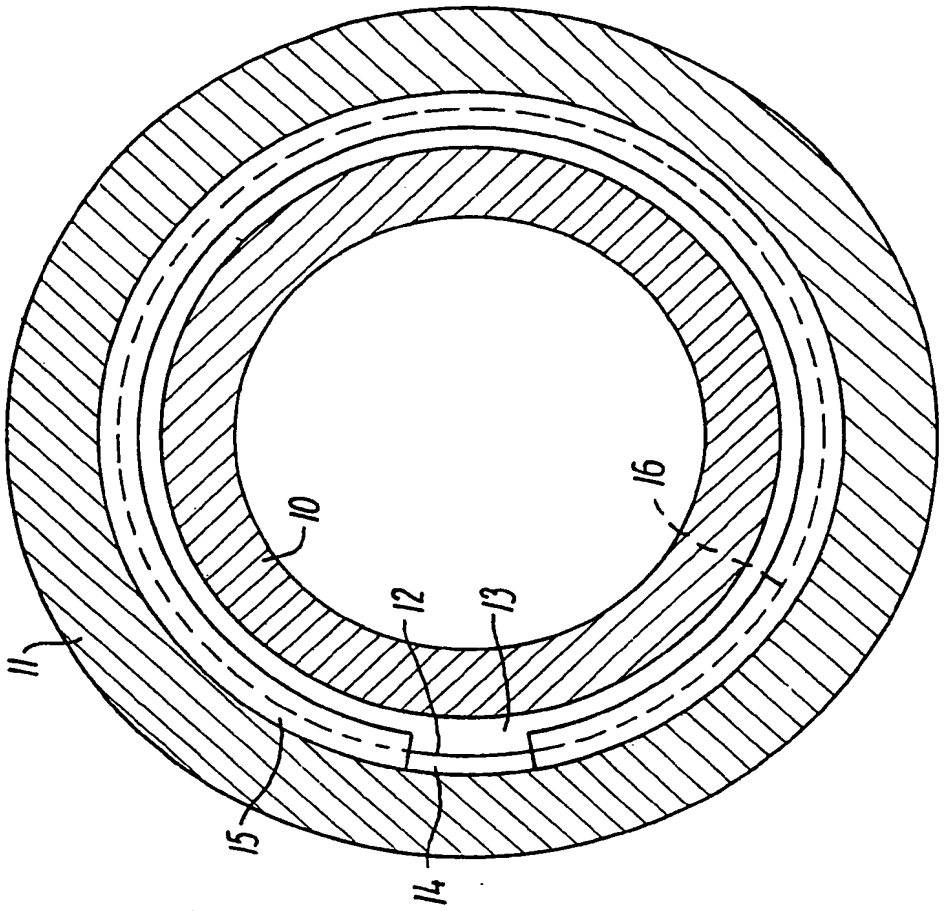
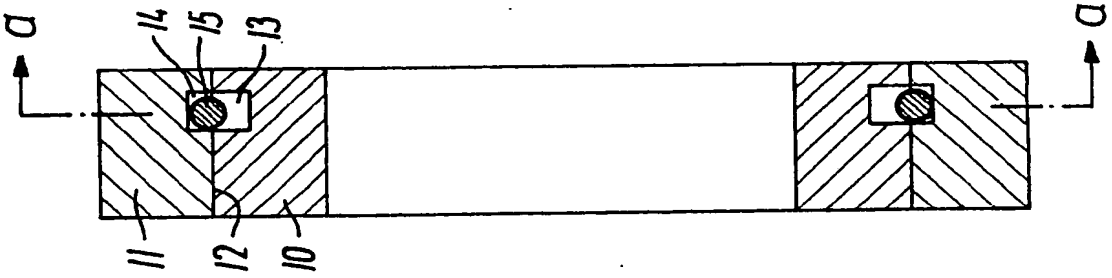


FIG.1



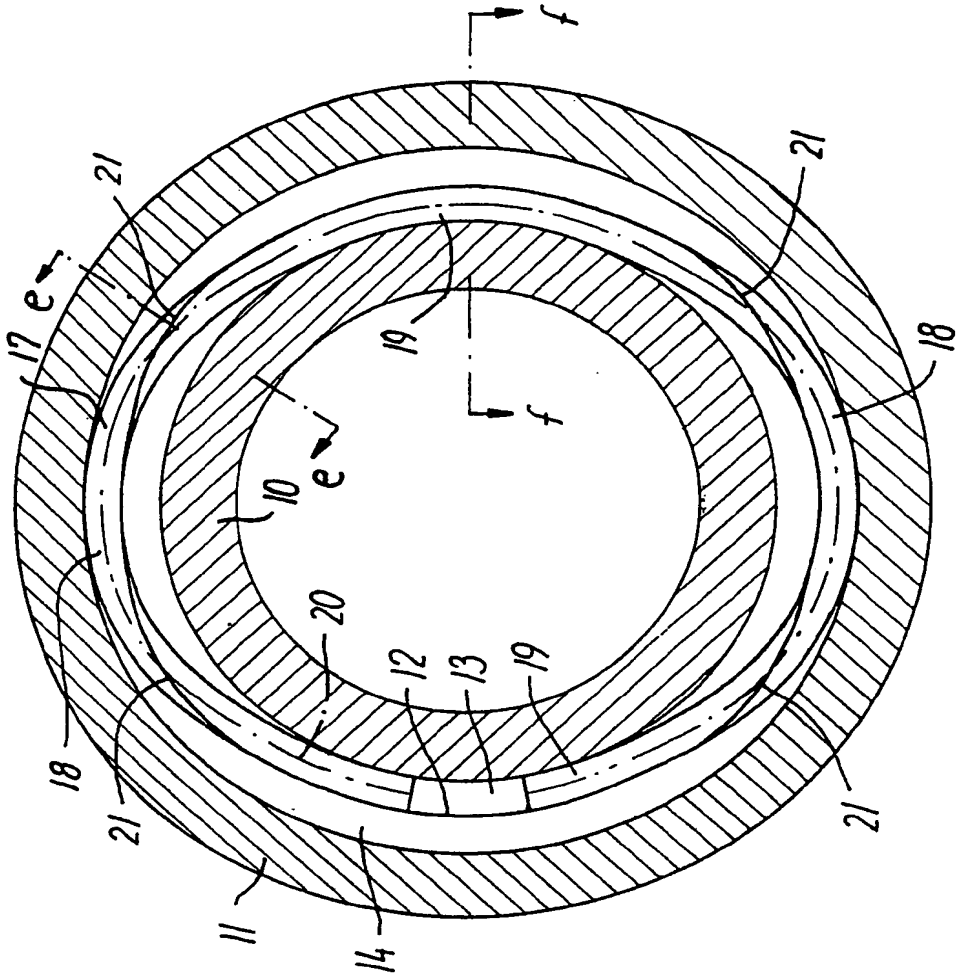


FIG.4

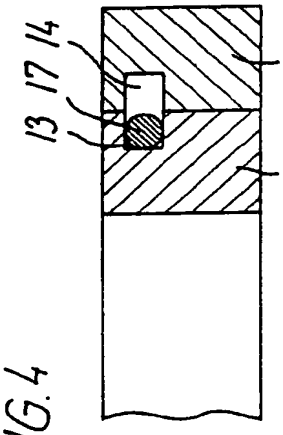


FIG.6

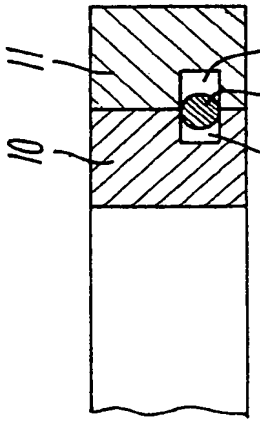


FIG.5

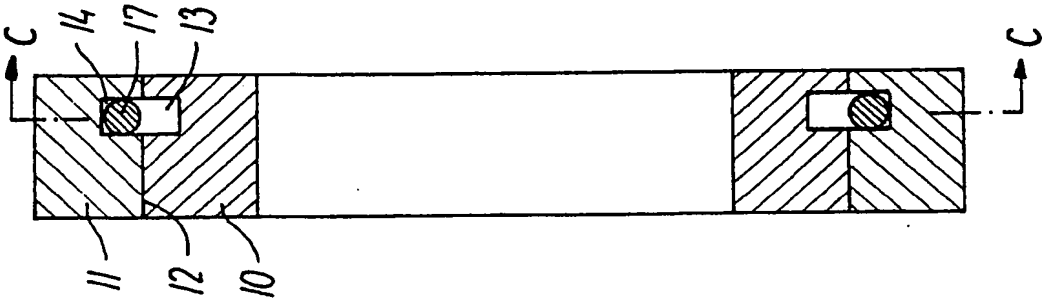


FIG.3

INTERNATIONAL SEARCH REPORT

International Application No PCT/DK 91/00359

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC5: F 16 B 21/18, F 16 D 1/06

II. FIELDS SEARCHED

Minimum Documentation Searched[7]

Classification System	Classification Symbols
IPC5	F 16 B; F 16 D; F 16 L

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched[8]

SE,DK,FI,NO classes as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

Category *	Citation of Document,[11] with indication, where appropriate, of the relevant passages[12]	Relevant to Claim No.[13]
X	FR, A, 1497512 (GLAENZER SPICER) 13 October 1967, see figures 5,6,7; claims 1-2 --	1-2
X	GB, A, 2201223 (ROLLS-ROYCE PLC) 24 August 1988, see page 2; figure 5 --	1-2
X	US, A, 3540760 (PAUL J. MILLER ET AL) 17 November 1970, see abstract; figures 1-3 --	1-2
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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
14th February 1992	19[illegible]
International Searching Authority	**Signature of Authorized Officer**
SWEDISH PATENT OFFICE	Jesper Stenström

Form PCT/ISA/210 (second sheet) (January 1985)

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO. PCT/DK 91/00359

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the Swedish Patent Office EDP file on 30/12/91
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Patent document cited in search report	Publication date	Patent family member(s)		Publication date
FR-A- 1497512	67-10-13	NONE		
GB-A- 2201223	88-08-24	DE-A-	3804560	88-09-01
		FR-A-	2611006	88-08-19
		JP-A-	63203910	88-08-23
US-A- 3540760	70-11-17	NONE		
US-A- 4934888	90-06-19	DE-A-	3828682	89-07-06
		FR-A-	2625270	89-06-30
		GB-A-	2214256	89-08-31
		JP-A-	1176809	89-07-13